

Indian Explosives Act (IV of 1884)

Indian Petroleum Act (VIII of 1899)

TWENTY-FOURTH ANNUAL REPORT

OF THE

Chief Inspector of Explosives in India

*BEING HIS ANNUAL REPORT FOR THE YEAR ENDING
31ST MARCH 1923.*



CALCUTTA
PERINTENDENT GOVERNMENT PRINTING, INDIA
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Twenty-fourth Annual Report of the Chief Inspector of Explosives in India.

No. 1414.

FROM

DR. W. P. ROBSON, M.A., PH.D., A.I.C.,

Offg. Chief Inspector of Explosives in India,

TO

THE SECRETARY TO THE GOVERNMENT OF INDIA,

DEPARTMENT OF INDUSTRIES AND LABOUR,

SIMLA.

Calcutta, the 17th August 1923.

SIR,

I have the honour to submit herewith a report of the work of my department during the year ending 31st March 1923.

2. Dr. N. L. Sheldon, Ph.D., F.I.C., Chief Inspector of Explosives, was granted 14 months' leave out of India with effect from 23rd August 1922.

Personnel

Major J. H. Allen, Inspector of Explosives, was granted 6 months' leave out of India on medical certificate with effect from 30th September 1922. An extension of leave has been granted him to September 1923.

Major J. Bennett, Inspector of Explosives, relieved Major Allen and Mr. S. E. Bird, Personal Assistant to the Chief Inspector of Explosives, was appointed to officiate as Inspector of Explosives in addition to his own duties.

Major J. Bennett, while on tour in South India, took ill and died at Madras on the 18th February.

Explosives.

3. During the year 1922, 209 licenses (four more than in the previous year) were granted in British India under Rule 46 and items 10 and 11 of Schedule II of the Indian Explosives Rules, 1914. The number of magazines licensed was 257 or 2 more than in 1921, and is in excess of the number of licenses granted, because in a number of cases firms have two or more magazines in one place under one license. A statement showing the number and location of the magazines and also the number of licenses granted in British India during the year 1922 is given in Appendix A, and a statement showing the number of magazines and licenses granted during the past ten years is shown in Appendix B.

4. During the year, 96 inspections of magazines were made; a number of magazines being inspected two or three times. Those magazines are inspected most frequently which are situated in the neighbourhood of towns or in populous localities, or which contain large quantities of explosives, or any explosive which on account of its greater susceptibility to decomposition and possible ignition, it is considered advisable to examine and test more frequently than other explosives. The number of inspections made is considerably less than that done last year. This is due to the fact that both the Inspectors fell ill, one being invalided home and the other having died in February last.

5. The magazines generally are in good order, and as usual magazine-owners have been found most willing to carry out recommendations even when involving considerable expense, and my thanks are due to them for making my duties easy in this respect.

6. The physical condition of all the explosives in the different magazines during the year was found to be good with the following exceptions which were found to have become defective and were destroyed :—

- (a) 25 coils defective safety fuze from Messrs. Gillanders, Arbuthnot & Co.'s magazine at Deshergurb.
- (b) 50 lbs. dynamite from the Public Works Department magazine at Malakand.
- (c) 964 electric detonators from the Andra Valley Power Supply Co.'s magazine at Humgaon.
- (d) 700 electric detonators from Messrs. Gillanders, Arbuthnot & Co.'s magazine at Bally.
- (e) 106 defective detonators from Messrs. Shaw Wallace & Co.'s magazine at Begunia.

7. During the year under report one case of theft of explosives was reported to this office.

8. One thousand eight hundred and twenty-seven tons of explosives were imported into British India during the year 1922, the value being Rs. 27,51,657. Full details showing the different kinds of explosives imported, and the value of each are given in Appendix C. A comparative statement showing the quantity of explosives imported during the last ten years is given in Appendix D.

9. A list of explosives at present authorised for importation into British India was published in the *Gazette of India* for information and is given in Appendix E.

10. Two licenses granted by the Governor General in Council for the manufacture of 1,000 and 500 lbs. gunpowder respectively in the Central Provinces were renewed during the year.

Petroleum.

11. During the year under report, 1,896 licenses for the storage of dangerous and non-dangerous petroleum, regarding which this department was concerned or consulted, were granted. A list of these premises, corrected up to 31st December 1922 and showing the districts in which they are located, is given in Appendix F.

In addition to the number of licenses shown in Appendix F, there are of course a large number of storage godowns licensed by District Officers of which this department has no cognizance. Efforts are being made, however, to obtain returns of all such premises, which it is considered necessary that this department should inspect.

12. A large number of special licenses have been granted under Rule 6, Chapter IV, Part II of the rules for the storage of dangerous petroleum in underground tanks under the Bowser and similar systems.

13. The introduction of Form O of the Rules under the Petroleum Act has been approved of by the Government of India. This Form is a license for a pipe line to transport petroleum.

14. In all 328 inspections of non-dangerous and partly dangerous and partly non-dangerous petroleum premises were made. Four hundred and twenty-one inspections of dangerous petroleum premises were also made by this department during the year.

15. The large petroleum installations are usually under efficient European supervision and are in good order and well looked after.

16. The small or minor petroleum installations are installations in which not more than 50,000 gallons of kerosine oil or liquid fuel in combined bulk and non-bulk are stored. These are looked after by Indian Agents, employed by the large oil firms. The oil for these installations is supplied from the major installations at the different ports, and the retail trade is carried out in them. A great deal of inspection of these minor installations has been done by this department with the result that their condition is very much improved and the vast majority of them are in very good order. As a matter of fact when an installation is found not up to the mark at an inspection, it is usually due to the fact that some new Agent has been recently appointed who has not realised what is required of him. The oil companies do not hesitate to change their Agents if several unsatisfactory reports are made of the installations under their charge.

17. During the year 1922, 117,969,130 gallons of non-dangerous petroleum and 73,833 gallons of dangerous petroleum were imported by sea into British India. The details are given in Appendix G, and also the quantities of non-dangerous and dangerous petroleum produced in Assam, and Burma during the year as well as during the past ten years.

ACCIDENTS.

18. A list of accidents, with a short account of each, that have occurred with explosives, inflammable substances, dangerous goods, etc., between the 1st January and 31st December 1922 and that have been reported to this department is given in Appendix H. It will be seen from a perusal of the details that the accidents have practically all been caused by gross neglect of ordinary precautions. In all there were 22 accidents causing 20 deaths and injuries to 20 persons. Comparative statements given in Appendices I and J show the total number of accidents and the number of persons killed or injured by them during the last ten years. As stated in previous reports, it is very doubtful whether all accidents that occur are duly reported to this department and therefore it is very possible that the statistics given are underestimated.

As a rule, the only accidents that are entered in Appendix H are those which cause loss of life or injuries or are important from some point of view.

Gunpowder, Class I.

19. There were four accidents from gunpowder during the year, causing seven deaths and injuries to seven persons.

Nitro-compounds, Class III.

20. There were no accidents from nitro-compounds reported during the year.

Chlorate Mixture, Class IV.

21. One accident from a chlorate mixture causing the death of one person was reported during the year.

22. Three accidents from fulminates, causing two deaths and injuries to five persons were reported during the year.

Fulminates, Class V.

Ammunition, Class VI.

23. There was one accident from ammunition causing injuries to one person.

Fireworks, Class VII.

24. One accident from fireworks caused injuries to one person.

25. There were ten accidents from petroleum during the year, which were responsible for eight deaths and injuries to two persons. It will be seen from a perusal of the accidents in Appendix H that carelessness is a prominent feature in most of them. In India the petroleum accidents are caused usually by naked lights being brought into proximity to oil vapour.

26. A number of fires were reported to this office as having occurred during the year in the Burma Oil Fields.

Chemicals.

27. There were no accidents from chemicals reported during the year.

28. There were two miscellaneous accidents causing the death of two persons and injuries to four others.

Miscellaneous.

GENERAL REMARKS.

29. Twelve reports of inspection of these magazines by civil officers have been received in this office, and I have brought to the notice of the officers concerned any irregularities or defects which required remedying. There is no doubt that the introduction of this system of sending these reports to this office has been desirable, as even from the short time it has been in existence, I have come across a good many instances of ignorance and want of expert knowledge, which might have caused disasters. High explosives in these magazines had previously never been tested, and I have in dealing with these reports, always recommended that samples of these explosives should be sent at least once a year to Chemical Examiners for test.

30. No State Railway magazines were inspected by this department during the year.

31. The license to manufacture and possess in a Factory, Toy Fireworks containing Fulminate of Silver granted to Messrs. Bonbonniere, Limited, Calcutta, was renewed during the year. The maximum quantity of free explosive allowed in the Factory at any one time is limited to 24 grains.

32. On the 21st May 1922, a lighter containing 2,072 cases of high explosives and detonators, while being towed in the harbour of Bombay, sank near Tucker Beacon.

A detailed report by Dr. N. L. Sheldon, Ph.D., F.I.C., Chief Inspector of Explosives, to the Government of Bombay on the occurrence is contained in Appendix L of this report.

33. The Government of India sanctioned a revised proviso to Rule 3, Chapter II, Part II of the Petroleum Rules the object being to bring the rule into line with rules under section 53 of the Native Passengers Ships Act, 1887, which have been similarly amended. The Government of India sanctioned certain amendments to Forms H and K and to the first set of conditions expressed in the endorsement of Form I of the Indian Petroleum Rules so as to regulate the transport by sea of dangerous petroleum otherwise than in bulk. The Government of India also sanctioned revised rules 7 and 8 of Chapter I, Part II of the Petroleum Rules with regard to the testing of lightning conductors in petroleum installations.

34. The Government of India at the request of the Chief Inspector of Explosives, addressed all Local Governments, suggesting, that plans of all installations, whether for petrol, kerosine or liquid fuel and which are not already licensed should be forwarded to him for approval. The suggestion is being acted upon,

35. The Chief Inspector of Explosives suggested that Calcium Phosphide should be brought under the Indian Petroleum Act. The Government of India accordingly in June 1922 issued a Notification applying to this article the provisions of sections 8 to 15, 17, 18, 23, and 24 of the above Act and prescribed, that for the quantity of petroleum mentioned in section 11 of the same Act, such quantity or quantities of Calcium Phosphide shall be substituted, as may be prescribed by the Rules for the time being in force relating to the possession of Calcium Phosphide.

At the same time the Government of India directed Local Governments, that, in so far as they are applicable, the rules regulating the importation, possession and transport of carbide of calcium, issued by Local Governments, shall *mutatis mutandis* and with the exception of Rule 1 of Part II of these rules, be the rules regulating the importation, possession and transport of Calcium Phosphide.

Local Governments were also authorised to exempt from the operation of section 11 of the Indian Petroleum Act Calcium Phosphide carried by any ship for use on that ship, provided that it is contained in specially prepared danger and distress lights.

36. I have had repeated enquiries as to whether licenses under the Indian Explosives Act are required for the possession of certain ingredients necessary for the manufacture of the heads of matches.

Although mixtures of some of these substances would constitute explosives and their possession, etc., be governed by the Indian Explosives Act, I have stated that, in themselves they are harmless, and, in the above manufacture, no license is required for their possession with the exception of Sulphur which is governed by the Indian Arms Act.

37. A very large number of enquiries of a varied nature have been received during the course of the year from District Officials, private individuals, firms and Railways. These were all dealt with.

38. I have been consulted by the Indian Railway Conference Association in connection with numerous amendments and additions to the rules contained in the Red Pamphlet No. 5 (Rules and Rates for the conveyance of explosives and other Dangerous Goods by Rail).

39. The number of inspections done by this department during the year were 845. To give some idea of the work and the ground covered, I give the following details of the work done by the Inspectors of Explosives.

During the 12 months, 1st April 1922 to 31st March 1923, the two Inspectors at Calcutta and Bombay were away from head-quarters for 151 and 22 days and travelled 16,551 and 4,058 miles respectively.

The Chief Inspector of Explosives and Offg. Chief Inspector were on tour for 155 days, travelled 29,026 miles, and inspected 60 explosives magazines and 397 petroleum installations and godowns, and went on inspection duty to the Burma, Assam and Punjab Oil Fields and visited the ports of Calcutta, Madras, Bombay and Calicut, etc.

40. This office is now permanently located in Calcutta at No. 1, Council House Street,

I have the honour to be,

Sr,

Your most obedient servant,

W. P. ROBSON,

Offg. Chief Inspector of Explosives in India.

APPENDIX A—contd.

List of Magazines and Licenses granted under Rule 46 and items 10 and 11 of Schedule II of the Indian Explosives Rules, 1914, for the year 1922—contd.

Presidency or Province.	District.	MAGAZINES.			LICENSES.		
		Under renewed license.	Under new license.	TOTAL	Renewed	New.	TOTAL.
Burma.	Amherst . . .	1	...	1	1	...	1
	Bassein . . .	1	...	1	1	...	1
	Hanthawaddy . .	4	...	4	2	...	2
	Katha . . .	1	...	1	1	...	1
	Mergui . . .	1	...	1	1	...	1
	Northern Shan States	6	...	6	3	...	3
	Pegu . . .	1	...	1	1	...	1
	Tavoy . . .	6	...	6	4	...	4
	Thaton . . .	8	1	9	6	1	7
	TOTAL	29	1	30	20	1	21
Central Provinces	Amraoti . . .	1	...	1	1	...	1
	Balaghat . . .	4	...	4	4	...	4
	Betul . . .	1	...	1	1	...	1
	Bhandara . . .	2	...	2	2	...	2
	Bilaspur . . .	1	...	1	1	...	1
	Chanda . . .	4	...	4	3	...	3
	Chhindwara . . .	4	1	5	4	1	5
	Jubbulpur . . .	...	1	1	...	1	1
	Nagpur . . .	7	...	7	7	...	7
	Narsinghpur . . .	1	...	1	1	...	1
	Raipur . . .	3	...	3	4	...	4
	TOTAL	28	2	30	28	2	30
Coorg . . .	Mercara . . .	1	...	1	1	...	1
	TOTAL	1	...	1	1	...	1
Hyderabad . . .	Chamavallam . .	1	...	1	1	...	1
	TOTAL	1	...	1	1	...	1

APPENDIX D.

Comparative statement showing the imports of explosives by sea into British India from other countries for the ten years ending 1922.

Explosives.	1913	1914.	1915	1916	1917.	1918	1919.	1920	1921	1922.
Gunpowder, black . lbs	213,713	240,821	137,807	111,205	80,450	02,500	131,000	117,740	01,710	123,075
„ smokeless „	21,470	11,865	13,325	33,585	7,116	20,965	67,485	6,550	22,400	18,436
Dynamite . . „	431,300	517,076	214,782	323,323	152,000	218,404	414,068	303,300	623,000	275,000
Blasting gelatine . „	850,621	627,026	783,972	233,018	..	21,012	380,752	000,000	102,000	530,100
Gelignite or gelatine dynamite.	202,518	201,190	103,172	838,487	1,237,406	1,020,590	601,534	320,023	406,312	482,500
Other nitro compound „ explosives.	277,792	282,803	278,207	327,353	186,437	131,214	140,435	208,480	167,180	141,272
Detonators . . No	5,028,850	4,728,000	4,258,300	6,306,000	4,807,000	1,780,612	5,970,204	2,752,900	3,094,702	3,655,057
Fireworks . . lbs	2,276,809	2,051,861	2,830,327	2,075,592	2,125,170	1,102,857	1,291,131	2,782,398	3,710,897	9,838,853
TOTAL . lbs	4,323,322	4,632,642	4,463,482	4,541,671	3,814,690	2,710,282	3,016,515	4,344,783	5,022,409	5,423,136
TOTAL . No	5,028,850	4,728,000	4,258,300	6,306,000	4,807,000	1,780,612	5,970,204	2,752,900	3,094,702	3,655,057

APPENDIX E.

DEPARTMENT OF EXPLOSIVES.

NOTIFICATION.

Calcutta, the 25th April 1923.

No. 814.—With reference to the following Notifications publishing rules to regulate the manufacture, possession, sale, transport and importation of explosives, the following list of "Authorized Explosives" referred to in the rule mentioned against each Notification is published for general information:—

Rule 4 (3) of Notification No. 4013—33, dated the 6th June 1914, of the Government of India, Department of Commerce and Industry.

Rule 4 (3) of Notification No. 1183, dated the 11th November 1914, of the Chief Commissioner, Central Provinces, applicable to Berar.

Rule 4 (3) of Notification No. 14, dated the 23rd April 1915, of the Resident in Mysore applicable to the Civil and Military Station of Bangalore and on the Railways in Mysore under British Jurisdiction.

Rule 4 (3) of Notification No. 67-J., dated the 28th August 1914, of the Resident at Hyderabad applicable to the Cantonments of Secunderabad and Aurangabad, the

Rule 4 (3) of Notification No. 34-J., dated the 20th April 1915, Hyderabad Residency Bazaars and the Railway lands in the Hyderabad State.

Rule 3 (3) of Notification No. 99, dated the 19th July 1916, of the Government of Burma applicable to the Northern Shan States.

Rule 3 (3) of Notification No. 5313, dated the 29th October 1918, of the Agent to the Governor-General in Rajputana.

Rule 3 (3) of Notification No. 1812-B., dated the 10th November 1919, of the Agent to the Governor-General in Central India, applicable to Railway lands in Central India, specified in the Notification of the Government of India in the Foreign Department No. 261-I.B., dated 10th February 1913.

LIST OF AUTHORIZED EXPLOSIVES.

The following explosives are at present authorized for importation into British India for general sale:—

CLASS 1.—GUNPOWDER.

The term "gunpowder" means gunpowder ordinarily so called.

GUNPOWDER.

CLASS 2.—NITRATE MIXTURE.

The term "nitrate mixture" means any preparation, other than gunpowder ordinarily so called, formed by the mechanical mixture of a nitrate with any form of carbon or with any carbonaceous substance not possessed of explosive properties, whether sulphur be or be not added to such preparation, and whether such preparation be or be not mechanically mixed with any other non-explosive substance, and includes any explosive containing a perchlorate and not being a chlorate-mixture, fulminate or nitro-compound as defined in Rule 4 of the Indian Explosives Rules, 1914.

EVERY BLASTING EXPLOSIVE IN THIS CLASS, IN WHICH NITRATE OF AMMONIUM, NITRATE OF SODIUM OR CHLORIDE OF SODIUM ARE USED AS INGREDIENTS, SHALL BE CONTAINED IN CARTRIDGE WRAPPERS OR CASES (OR IN FIVE-POUND INNER PACKAGES) MADE THOROUGHLY WATERPROOF WITH MELTED PARAFFIN OR OTHER SUITABLE WATERPROOFING MATERIAL.

CHILWORTH SPECIAL POWDER.

CLASS 3.—NITRO-COMPOUND.

The term "nitro-compound" means any chemical compound possessed of explosive properties or capable of combining with metals to form an explosive compound, which is produced by the chemical action of nitric acid (whether mixed or not with sulphuric acid or of a nitrate mixed with sulphuric acid upon any carbonaceous substance, whether such compound is mechanically mixed with other substances or not.

The nitro-compound class has two divisions.

EVERY EXPLOSIVE IN THIS CLASS AND EVERY EXPLOSIVE INGREDIENT THEREOF SHALL BE SO THOROUGHLY PURIFIED AND OTHERWISE OF SUCH CHARACTER AS TO SATISFY A TEST KNOWN AS THE HEAT TEST, AND SPECIFIED IN THE RULE FOR TESTING EXPLOSIVES PUBLISHED WITH GOVERNMENT OF INDIA, DEPARTMENT OF COMMERCE AND INDUSTRY, NOTIFICATION No. 4013—33, DATED THE 6th JUNE 1914, REFERRED TO ABOVE.

EVERY BLASTING EXPLOSIVE IN THIS CLASS, IN WHICH NITRATE OF AMMONIUM, NITRATE OF SODIUM OR CHLORIDE OF SODIUM ARE USED AS INGREDIENTS, SHALL BE CONTAINED IN CARTRIDGE WRAPPERS OR CASES (OR IN FIVE-POUND INNER PACKAGES) MADE THOROUGHLY WATERPROOF WITH MELTED PARAFFIN OR OTHER SUITABLE WATERPROOFING MATERIAL.

DIVISION 1.

Division 1 comprises the following explosives and any chemical compound or mechanically mixed preparation which consists either wholly or partly of nitro-glycerine or of some other liquid nitro-compound:—

Ardeer Gelignite.	Cordite.
Arkite. }	Cordite, M. D.
Samsonite. }	Dynamite.
Victor Powder No. 2.	Dynobel No. 2.
A 2. Monobel.	Dynobel (Export) No. 3. }
Viking (Export) No. 1. }	Dynobel No. 3.
Viking (Export) No. 2. }	Dynobel No. 4. }
Viking Powder No. 1. }	Farmer's Dynamite.
Viking Powder No. 2. }	Gelatine Dynamite.
Ballistite	Gelignite.
Plasting Gelatine.	Monobel, No. 1.
Cambrite No. 2.	Revite.
Chilworth Smokeless Powder, No. 2.	Arlite. }
	Samsonite. }

PROVIDED THAT EVERY EXPLOSIVE IN THIS DIVISION SHALL BE OF SUCH CHARACTER AND CONSISTENCY AS NOT TO BE LIABLE TO LIQUEFACTION OR EXPANSION.

PROVIDED ALSO THAT AN EXPLOSIVE WHICH IS REQUIRED BY DEFINITION TO BE ISSUED IN WATERPROOF INNER PACKAGES MAY BE EXEMPTED FROM SUCH REQUIREMENTS BY SPECIAL AUTHORITY WHEN AND SO LONG AS THE CONDITIONS OF SUCH AUTHORITY ARE OBSERVED.

DIVISION 2.

Division 2 comprises the following explosives and any nitro-compound as before defined which is not comprised in division 1:—

Amberite, No. 2.	Negro Powder No. 2.
Alumatol. }	Neonite.
Ammonal. }	N. S. Smokeless.
Di-nitro-phenol.	Picric Acid.
Economic Smokeless Sporting Powder. }	Picric Powder.
E. C. Sporting Powder }	Primrose Smokeless. }
Eley Smokeless Sporting Powder. }	Stowmarket Smokeless. }
Lampie Powder. }	Remington Dense Powder.
Light Load Smokeless. }	Roburite, No. 4.
Frankite }	Ruby Powder.
Fulmen Powder. }	Schultze Cube Powder.
Imperial Schultze Gunpowder. }	Schultze Gunpowder.
Lightning Powder. }	Smokeless Diamond.
Gunecotton.	Tomite or Cotton Powder.
Ideal Powder. }	Tri-nitro-toluol.
Nobel's Special Powder. }	

CLASS 4.—CHLORATE MIXTURE.

*The term "chlorate mixture" means any explosive containing a chlorate.
The chlorate mixture class has two divisions.*

EVERY EXPLOSIVE IN THIS CLASS AND EVERY EXPLOSIVE INGREDIENT THEREOF SHALL BE SO THOROUGHLY PURIFIED AND OTHERWISE OF SUCH A CHARACTER AS TO SATISFY A TEST KNOWN AS THE HEAT TEST, AND SPECIFIED IN THE RULE FOR TESTING EXPLOSIVES PUBLISHED WITH GOVERNMENT OF INDIA, DEPARTMENT OF COMMERCE AND INDUSTRY, NOTIFICATION No 4013—33, DATED THE 6TH JUNE 1914, REFERRED TO ABOVE.

EVERY BLASTING EXPLOSIVE IN THIS CLASS, IN WHICH NITRATE OF AMMONIUM, NITRATE OF SODIUM OR CHLORIDE OF SODIUM ARE USED AS INGREDIENTS, SHALL BE CONTAINED IN CARTRIDGE WRAPPERS OR CASES (OR IN FIVE-POUND INNER PACKAGES) MADE THOROUGHLY WATERPROOF WITH MELTED PARAFFIN OR OTHER SUITABLE WATERPROOFING MATERIAL.

DIVISION 1.

Division 1 comprises any chlorate preparation which consists partly of nitro-glycerine or of some other liquid nitro-compound.

Nil.

PROVIDED THAT EVERY EXPLOSIVE IN THIS DIVISION SHALL BE OF SUCH CHARACTER AND CONSISTENCY AS NOT TO BE LIABLE TO LIQUEFACTION OR EXUDATION.

DIVISION 2.

Division 2 comprises any chlorate mixture as hereinbefore defined, which is not comprised in Division 1.

Nil.

CLASS 5.—FULMINATE.

The term "fulminate" means any chemical compound or mechanical mixture, whether included in the foregoing classes or not, which, from its great susceptibility to detonation, is suitable for employment in percussion caps or any other appliances for developing detonation, or which from its extreme sensibility to explosion, and from its great instability (that is to say, readiness to undergo decomposition from very slight exciting causes) is especially dangerous.

This class consists of two divisions.

DIVISION 1.

Division 1 comprises such compounds as the fulminates of silver and of mercury, and preparations of those substances, such as are used in percussion caps; and any preparation consisting of a mixture of a chlorate with phosphorus or certain descriptions of compounds of phosphorus, with or without the addition of carbonaceous matter, and any preparation consisting of a mixture of a chlorate with sulphur, or with a sulphuret, with or without carbonaceous matter.

Nil.

DIVISION 2.

Division 2 comprises such substances as the chloride and iodide of nitrogen, fulminating gold and silver, diazobenzol, and the nitrate of diazobenzol.

Nil.

CLASS 6.—AMMUNITION.

The term "ammunition" means any explosive of any of the foregoing classes when the same is enclosed in any case or contrivance, or is otherwise adapted or prepared so as to form a cartridge or charge for small-arms cannon or any other weapon, or for blasting or to form any safety or other fuze for blasting or for shells, or to form any tube for firing explosives or to form a percussion cap, detonator, fog-signal, shell torpedo, war-rocket, or any other contrivance other than a firework.

*The term "percussion cap" does not include a detonator.**

The term "detonator" means a capsule or case which is of such strength and construction and contains fulminate in such quantity, that the explosion of one capsule or case would communicate the explosion to other like capsules or cases.

The term "safety fuze" means a fuze for blasting which burns and does not explode, and which does not contain its own means of ignition, and which is of such strength and construction and contains an explosive in such quantity that the burning of such fuze will not communicate laterally with other like fuzes.

The ammunition class has three divisions.

DIVISION 1.

Nobel's Safety Electric Time Fuze.
Percussion Caps.
Railway Fog Signals.

Safety Cartridges.
Safety Fuzes for blasting.
Safety Electric Fuzes.

* In consequence of the results of experiments carried out, it has been decided that a percussion cap can only be properly classed as such if it contains less than 0.6 grain, of a composition of the 1st Division of the fifth (Fulminate) class of which not more than 25 per cent. consists of fulminate of mercury or less than 0.5 grains, of any other explosive of the 1st Division of the fifth (Fulminate) Class, and it has been further decided that percussion caps shall not be classed as such when they contain anvils or have their composition unprotected by tin foil or other suitable substance, as under those circumstances they are liable to explode en masse.

DIVISION 2.

Division 2 comprises any ammunition as hereinbefore defined, which does not contain its own means of ignition, and is not included in Division 1.

Cartridges for Blasting or other like purposes.

Cartridges for Small Arms which are not Safety Cartridges.

Cordeau Bickford.

Electric Fuzes.

Electric Primers.

Fuze Lighters.

Instantaneous Fuze.

Port Fires.

Tubes for firing Explosives.

Quick Match.

DIVISION 3.

Division 3 comprises any ammunition as hereinbefore defined which contains its own means of ignition, and is not included in Division 1.

Cartridges for Small Arms which are not Safety Cartridges.

Detonators.

Electric Detonators.

Friction Tubes.

Nobel's Electric Detonator Time Fuze.

Percussion Primers.

Tubes for firing Explosives.

CLASS 7.—FIREWORK.

The term "firework" comprises firework composition and manufactured fireworks.

DIVISION 1.—FIREWORK COMPOSITION.

The term "firework composition" means any chemical compound or mechanically mixed preparation of an explosive or inflammable nature, which is used for the purpose of making manufactured fireworks, and is not included in the former classes of explosives, and also any coloured fire composition, subject to the proviso to the definition of manufactured fireworks.

Nil.

DIVISION 2.—MANUFACTURED FIREWORKS.

MANUFACTURED FIREWORKS, consisting of any explosive of the classes 1, 2, 3, 4 and 6 and any firework composition, when such explosive or composition is enclosed in any case or contrivance or is otherwise manufactured so as to form a squib, cracker, toy cap or amorcc, serpent, rocket (other than a war-rocket), maroon, lance, wheel, Chinese fire, Roman candle, or other article specially adapted for the production of pyrotechnic effects, or pyrotechnic signals, or sound signals.

Provided that a substantially constructed and hermetically closed metal case, containing not more than one pound of coloured fire composition of such a nature as not to be liable to spontaneous ignition shall be deemed to be a "manufactured firework" and not a "firework composition."

Aluminium or Magnesium Torches.

Amorces.

Chinese Crackers.

Light Signals.

Magnesium or Aluminium Torches.

Manufactured Fireworks.

Pyrotechnic Matches.

Rockets.

Sparklers.

W. P. ROBSON,

Offg. Chief Inspector of Explosives, India.

APPENDIX F.

* List of petroleum premises licensed during the year 1922.

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
Ajmer-Merwara	Ajmer	7		Brought forward . .	18
	TOTAL	7		Cuttack	6
Assam	Cachar	4	Bihar and Orissa	Darbhanga	3
	Darrang	2		Gaya	6
	Goalpara	9		Hazratibagh	7
	Kamrup	3		Manbhum	25
	Lakhimpur	3		Monghyr	3
	Nawgong	2		Muzaffarpur	32
	Shillong	1		Palamau	4
	Sibsagar	11		Patna	10
Baluchistan	TOTAL	35		Puri	1
	Quetta	8		Purnea	10
	TOTAL	8		Ranchi	6
	Backwani	28		Sambalpur	8
	Bankura	4		Sarat	6
	Birbhum	2		Shahabad	3
	Bogra	3		Simlabhum	13
	Burdwan	17		Sonthal Parganas . .	16
	Calcutta	41		TOTAL	177
	Chittagong	13		Adin	8
	Dacca	2		Ahmedabad	42
	Darjeeling	8		Ahmednagar	3
	Dumai	6		Belgaum	13
	Hooghly	5		Bljapm	6
	Honrah	8		Bombay	58
	Jalpaiguri	10		Broach	9
	Khulna	11		Dharwar	12
	Midnapur	25		Hyderabad (Sind) . .	5
	Munshidabad	19		Katra	1
	Nadli	7		Katubi	18
	Pabna	2		East Khandesh	4
	Rajshahi	13		West Khandesh	8
	Rangpur	23		Kolhapur	3
	Tippica	30		Nashk	11
	24-Parganas	18		Poona	13
	TOTAL	205		Satara	7
	Bilaspur	5		Sholapur	3
	Bhagalpur	7		Sulkur	1
	Champaran	6		Surat	11
	Carrickover	18		Thana	8
				TOTAL	217

* This list includes installations and godowns for the storage of dangerous and non dangerous petroleum regarding which this Department has cognizance.

APPENDIX F—contd.

* List of petroleum premises licensed during the year 1922—contd.

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
Burma	Akyab	2	Coorg	Coorg	3
	Bassein	2		TOTAL	3
	Bhamo	2	Delhi	Delhi	25
	Hanthawaddy	0		TOTAL	25
	Lower Chindwin	3			
	Magwe	37	Hyderabad	Hyderabad	18
	Mandalay	10		Secunderabad	7
	Maulan	1		TOTAL	25
	Morgui	2	Jaipur	Jaipur	1
	Munba	20		TOTAL	1
	Myingyan	0			
	Northern Shan States	5		Anantapur	5
	Pegu	0		Bellary	7
	Pakoku	0		Chingleput	12
	Promo	5		Chittoor	6
	Rangoon	14		Coimbatore	18
	Ruby Mines	3		Cuddapah	3
	Sagaling	2		Ganjam	0
	Tavoy	3		Godavari	8
	Tharrawaddy	2		Guntur	18
	Thatun	3		Kistna	23
Central Provinces	Thayrtmyo	13	Madras	Kurnool	10
	Upper Chindwin	3		Madras	20
	TOTAL	165		Madura	23
	Akola	8		Malabar	20
	Amraoti	12		Nellore	1
	Bhandara	9		North Arcot	14
	Bilaspur	8		The Nilgiris	8
	Buldana	0		Ramnad	17
	Chanda	10		Salcm	7
	Chhindwara	5		South Arcot	20
	Damoh	4		South Canara	12
	Hoshangabad	0		Tanjore	18
	Jubbulpore	19		Tinnevely	11
	Nagpur	17		Trichanopoly	12
	Narsimgpur	3		Viragapatam	16
	Nimar (Khandwa)	8		TOTAL	350
	Raipur	15	Mysore	Bangalore	20
	Saugor	1		TOTAL	20
	Seoni	2	North West Frontier Province	Hazara	4
	Wardha	10		Peshawar	22
	TOTAL	158		TOTAL	26

* This list includes installations and godowns for the storage of dangerous and non-dangerous petroleum regarding which this department has cognizance.

APPENDIX F—concl'd.

* List of petroleum premises licensed during the year 1922—concl'd.

Presidency or Province.	District.	No.	Presidency or Province.	District.	No.
Punjab	Ambala	21	United Provinces	Brought forward	70
	Amritsar	5		Benares	11
	Attock	3		Bijnor	11
	Ferozepur	4		Budaun	1
	Gujranwala	1		Bulandshahr	1
	Gujrat	1		Cawnpore	10
	Gurdaspur	3		Dehra Dun	16
	Hoshiarpur	3		Etawah	5
	Jullundur	10		Farrukhabad	4
	Karnal	1		Fyzabad	7
	Lahore	6		Garhwal	2
	Ludhiana	14		Ghazipur	2
	Lyalpur	4		Gonda	6
	Multan	3		Gorakhpur	6
	Rawalpindi	10		Jaunpur	3
United Provinces	Shahpur	5		Jhansi	9
	Sialkot	6		Lucknow	12
	TOTAL	103		Meerut	16
	Agra	9		Mirzapore	1
	Aligarh	6		Moradabad	4
	Allahabad	11		Muttra	4
	Almora	3		Muzaffarnagar	4
	Azamgarh	5		Naini Tal	7
	Bahraich	4		Partabgarh	3
	Ballia	2		Rae Bareilly	1
	Bara Bank	5		Saharanpur	16
	Barilly	10		Shahjahanpur	4
	Basti	15		Sultanpur	3
	Carried over	70		TOTAL	230

* This list includes installations and godowns for the storage of dangerous and non-dangerous petroleum regarding which this department has cognizance.

SUMMARY.

Presidency or Province.	No.
Ajmer-Merwara	7
Assam	35
Baluchistan	8
Bengal	205
Bihar and Orissa	177
Bombay	247
Burma	105
Central Provinces	158
Coorg	3
Delhi	25
Hyderabad	28
Jaipur	1
Madras	356
Mysore	20
North-West Frontier Province	26
Punjab	103
United Provinces	230
TOTAL	1,506

APPENDIX G.

Statement showing the quantity of petroleum imported by sea into British India during the ten years ending 1922.

Non-Dangerous Petroleum.

Port or Province	1913	1914.	1915.	1916.	1917.	1918	1919	1920	1921.	1922
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Chittagong	9,927,422	9,896,242	10,674,018	10,470,117	11,919,028	13,351,210	13,443,670	13,019,301	10,474,431	12,607,032
Chandball	966,000	566,000	276,752	218,000	268,000	105,320	222,764	82,274	124,502	126,696
Calcutta	29,720,828	30,077,070	29,221,557	29,677,629	14,012,197	8,812,561	38,015,867	30,590,802	21,332,163	28,164,477
Bombay	46,615,627	20,724,542	22,829,347	23,742,100	22,208,707	29,153,591	40,395,276	40,026,379	47,892,133	53,170,680
Sri Lanka	10,017,700	11,670,000	8,091,277	4,610,740	7,967,031	4,177,700	8,857,077	10,090,225	7,002,020	7,512,110
Madrass	12,406,817	13,576,714	14,057,719	14,443,500	6,007,846	8,163,494	17,072,135	15,253,691	8,140,757	12,397,032
Burma	1,146,007	1,036,077	1,066,690	562,277	22,021	617,368	204,670	728,070	207,207	919,077
TOTAL	109,167,077	106,053,031	117,715,767	113,810,741	63,723,011	64,475,972	123,827,509	110,210,477	64,774,209	117,069,130

Dangerous Petroleum.

Port or Province.	1913.	1914.	1915	1916.	1917.	1918	1919	1920	1921.	1922.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Chandball	..	..	..	..	..	..	240	407	..	..
Chittagong	..	..	..	..	..	24,108	20,294	30,761	53,601	61,147
Calcutta	319	182	2,110	28,916	..	32,150	6,656	3,596	8,491	8,353
Bombay	772,666	18,060	48,000	12,005	110,948	..	40	..	5	5
Sri Lanka	8,574	1,571	4,024	2,200	..	..	..	84	..	..
Madrass	..	..	4	..	221,990	..	12,000	108	1,000	100
Burma	240	10	..	1,000	716	20	94	16	150	4,228
TOTAL	781,229	20,006	54,738	44,234	305,031	76,376	17,541	45,148	65,607	73,873

Statement showing the quantity of petroleum produced in Burma and transported into British India during the ten years ending 1922.

	1913.	1914.	1915.	1916.	1917.	1918	1919.	1920.	1921.	1922.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Non-dangerous petroleum.	108,781,837	106,001,718	106,720,414	111,031,572	112,324,470	119,764,006	101,059,475	112,872,624	117,520,671	119,782,070
Dangerous petroleum.	2,445,212	3,731,774	8,717,284	5,905,120	5,341,073	5,742,729	6,700,470	16,460,720	15,608,138	15,032,679

APPENDIX G—contd:

Statement showing the quantity of petroleum produced in Assam and Burma during the ten years ending 1922.

Non-Dangerous Petroleum.

Province.	1913.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam . .	2,510,600	2,075,870	2,071,453	3,055,703	3,712,001	3,070,751	0,000,074	11,061,109	9,539,934	6,592,110
Burma . .	181,016,044	178,313,761	171,073,827	176,109,100	175,707,643	170,021,477	170,144,384	105,011,476	108,187,174	176,548,063
TOTAL .	183,526,644	180,389,631	173,145,280	179,168,803	179,419,644	173,092,228	170,284,458	116,072,585	117,727,108	183,140,173

Dangerous Petroleum.

Province.	1913.	1914.	1915.	1916.	1917.	1918.	1919.	1920.	1921.	1922.
	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.	Gallons.
Assam . .	170,770	217,803	240,219	260,075	401,010	448,738	415,155	471,154	27,070	601,230
Burma . .	32,375,142	32,281,818	30,129,420	33,174,761	32,405,754	33,005,609	30,623,058	30,201,352	37,784,017	30,530,210
TOTAL .	32,545,912	32,499,621	30,369,639	33,434,836	32,806,764	33,454,347	31,044,113	30,672,510	37,811,087	31,131,440

APPENDIX H.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1922 to 31st December 1922.

Explosives.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.
1	7th January 1922.	Gunpowder	Lahore	An empty powder van was used by a railway chowkidar as a temporary dwelling place. To proceed on duty he left his hooka alight in the van. Cloths and the woodwork of the van caught fire. His mother and son, who were asleep at the time, were overcome by fumes and fatally burnt.	2	..
2	8th May 1922.	Gunpowder	Jamshedpur	The accident was caused by the ignition of gunpowder in a store set apart for the purpose of preparing charges required for blasting in the greater extension scheme of the Tata Iron and Steel Coy. A committee after considerable deliberation, and having only the dying declaration of the deceased to guide them, concluded that the accident was caused by either one or more of the deceased smoking, as there was very little chance of the powder becoming ignited by any outside factor.	4	..
3	10th August 1922.	Gunpowder	Bombay	The accident occurred during Blasting Operations at the Municipal Works at Lova Grove. The actual scene of the work was at the base of a hill which consisted of "Mooram." Ten drifts had been made, the lowest one being from 6 to 7 feet long into which a charge of 10 lbs. of English powder was put, while the remaining 9 drifts contained from 20 to 25 lbs. of the same powder. Nothing untoward happened after the firing of the nine charges. When the lowest charge went off, pieces of hard mooram were scattered far and wide. Five persons were injured by the falling stones.	..	..
4	11th October 1922.	Gunpowder	Sankari Salem	Two pounds of blasting powder were purchased by a man for the purpose of sinking a well. As the powder appeared to be caked, he attempted to break it up with a pestle. It exploded. He was fatally injured and serious injuries were caused to two others.	1	..
TOTAL					7	7
5	15th May 1922.	Chlorate Mixture.	Calcutta	During a rehearsal at the Alfred Theatre, Calcutta, in order to produce certain artificial effects, a mixture of potassium chlorate and sugar contained in an iron pipe about 1 foot in length and 1 inch in diameter, was ignited. The mixture exploded shattering the pipe. One of the actors seated about 80 feet away was hit in the forehead by a piece of the pipe. He was so severely injured that he subsequently died.	1	..
TOTAL					1	..

APPENDIX H—contd.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1922 to 31st December 1922—contd.

Explosives—concl'd.

No.	Date of accident.	Nature of Explosive.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
6	14th October 1922.	Fulminate	Godavari	Two Indians were mixing potassium chlorate and sulphur for the purpose of making fireworks when an explosion occurred. They were both severely injured and also a boy who was standing near by at the time.	..	3
7	19th October 1922.	Fulminate	Calcutta	During the preparation of fireworks (presumably Bhulpatakas or throw-down bombs) an explosion occurred. The maker was fatally injured. From the analysis of scrapings it would appear that an intimate mixture of potassium chlorate and sulphur was being prepared by grinding.	1	..
8	19th October 1922.	Fulminate	Calcutta	Throw-down bombs were being prepared by three young Indians. They were using a mixture of potassium chlorate and sulphide of arsenic. An explosion occurred and all three were seriously injured, one succumbed to his injuries.	1	2
TOTAL					2	5
9	19th February 1922.	Ammunition	Bombay	Some loose charcoal which happened to contain an Eley 450 Rifle Cartridge was placed in a sizer by an Indian. The cartridge exploded and he was wounded.	..	1
TOTAL					..	1
10	30th April 1922.	Firework	Calcutta	A throw-down bomb of a variety frequently used at wedding ceremony celebrations was accidentally dropped in Bhowanipar Street. It exploded causing injuries to the carrier. Three Indians were implicated in the manufacture and possession of this bomb and others like it. They were prosecuted by the Police and convicted.	..	1
TOTAL					..	1

Petroleum.

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS.	
					Killed.	Injured.
11	27th March 1922.	Kerosine	Akola	The accident was due to an Indian woman, while asleep, upsetting a lighted kerosine oil lamp. Her clothes caught fire, and she was severely burnt. She died from the effects.	1	..
12	28th April 1922.	Ditto	Ditto	A lighted lantern was placed by an Indian near a tin containing kerosine oil. The oil in the tin was ignited with a result that the Indian was severely burnt. He died from the effects.	1	..

APPENDIX H—contd.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1922 to 31st December 1922—contd.

Petroleum—contd.

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.
13	23rd May 1922.	Kerosine.	Akola	An Indian, while putting kerosine oil on a lighted torch at a wedding ceremony was so severely burnt that he died from his injuries the same day.	1	
14	22nd May 1922.	Ditto	Ditto	While an Indian woman was pouring kerosine oil into a lighted lamp her clothes caught fire. She was severely burnt and died from the effects.	1	
15	9th October 1922.	Ditto	Khaur, Pindigeb, Attock.	A cooly dropped a wrench into a well head tank containing about two feet of oil. He endeavoured to recover it by going down a ladder into the tank. He was overcome by fumes. Attempts at rescue were made by two others. They were also overcome, but managed to get out in time. The cooly died.	1	
16	27th October 1922.	Petrol	Howrah	When a train made up of 16 wagons and a brake van was about to start for Santragachi, the fourteenth wagon from the engine containing petrol, was seen to be on fire. The wagon was immediately isolated. All efforts by the Fire Brigade to extinguish the fire proved futile as it was impossible to approach the wagon. It continued to burn until all the petrol was consumed. Two men of the Fire Brigade received severe burns. The cause of the fire could not be ascertained.		
17	6th November 1922.	Petrol	Rampur Hat	A wagon containing 600 tins of petrol was being unloaded at Rampur Hat. A considerable quantity of the spirit had leaked and saturated the matting which was used as packing on the floor. At about 7 P.M. a chowkidar unobserved by anyone, entered the wagon with a hand signal lamp with the result that the petrol vapour ignited and set his clothes as well as the wagon on fire. The man was removed to hospital where he succumbed to his injuries. The chowkidar's object in entering the wagon was evidently to try and obtain some petrol for his own use, as a broken bottle was found inside the wagon.	1	
18	8th November 1922.	Petrol	Champion Station.	While 200 tins of motor spirit were being unloaded a fire broke out in a corner of the wagon where the contents of a can had leaked out. The fire was extinguished with sand. No damage was done to the wagon but the handles of 16 cans became detached owing to the heat and the point of 10 tins was removed. The cause of the fire is believed to be due either to some one having smoked inside the wagon or having taken an unprotected light into it.		

APPENDIX H—concl'd.

Accidents by fire or explosion which have been brought to the notice of the Explosives Department from 1st January 1922 to 31st December 1922—concl'd.

Petroleum—concl'd.

No.	Date of accident.	Nature of Oil.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed.	Injured.
19	13th December 1922.	Petrol	Moulmein	A motor car in which the deceased was travelling developed engine trouble. His clothes became saturated with petrol in attempting to remedy a fault in the petrol system. The careless handling of a candle near a tin of petrol set the petrol on fire. The flames passed on to the clothes of the deceased, and he was so severely burnt that he died from the effects.	1	..
20	28th December 1922.	Petroleum	Khaur, Attock.	The deceased took a light to a small tank containing oil. The oil caught fire. He was severely burnt. He died the next day.	1	..
TOTAL					8	2

Miscellaneous.

No.	Date of accident.	Nature of substance.	Where accident occurred.	Circumstances of accident so far as ascertained.	NUMBER OF PERSONS	
					Killed	Injured.
21	20th August 1922.	Ammonia Gas	Bombay	Four men were at work on the Ammonia Refrigerator, situated below deck amidship, of the R. I.M. Steam Trawler "William Garriek." One of the men proceeded to loosen a joint in a pipe and to enable him to see what he was doing two of the others held lighted candle near the joint. On slackening a nut the survivors report that a flame about 20 feet long accompanied by a loud report resulted. The trawler had not been working for about six months. Of the four men in the refrigerator at the time two were killed and the other two severely injured. From the information supplied the accident is not understood.	2	2
22	20th April 1922.	Country Spirit	Ondal	A consignment of country spirit in drums arrived at Ondal Station. A certain amount of leakage was observed. Attempts to stop this were made by a checking clerk. He sent two chowkidars into the wagon for the purpose. A lamp was brought near the wagon. The leaking spirit was ignited with a result that the chowkidars were severely burnt and the wagon completely so.	..	..
TOTAL					2	4

APPENDIX I.

Summary of accidents during the year 1922.

Explosives or dangerous and inflammable substances.	ACCIDENTS CAUSING LOSS OF LIFE AND BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	NUMBER OF PERSONS			
		Killed.	Injured.		
<i>Explosives.</i>					
Gunpowder	4	7	7	...	4
Nitro-compounds	1	1	...	...	1
Chlorate Mixture	3	2	5	...	3
Fulminates	1	...	1	...	1
Ammunition	1	...	1	...	1
Fireworks	1	...	1	...	1
TOTAL	10	10	14	...	10
<i>Petroleum.</i>					
Petroleum generally	0	8	2	1	10
TOTAL	0	8	2	1	10
<i>Chemicals . . . . .</i>	...	...	...	...	...
TOTAL . . . . .	...	...	...	...	...
<i>Miscellaneous</i>	2	2	4	...	2
TOTAL	2	2	4	...	2
GRAND TOTAL	21	20	20	1	22

APPENDIX J.

Detailed statement showing the number of accidents and persons killed and injured during the ten years ending 1922.

Year.	GUNPOWDER.			DYNAMITE AND OTHER NITRO-COMPOUND BLASTING EXPLOSIVES.			CHLORATE MIXTURE.			FULMINATES.			AMMUNITION.			FIREWORKS		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1913	15	12	25	3	2	1	..	..	..	..	..	..	1	..	1	11	14	26
1914	8	0	7	3	..	5	..	..	..	..	..	..	..	..	..	6	5	21
1915	2	2	3	2	2	..	..	..	..	1	..	1	1	..	1	4	2	3
1916	3	2	3	..	..	..	..	..	..	1	..	1	..	..	..	1	..	1
1917	0	0	7	1	..	1	..	..	..	..	..	..	5	..	5	1	1	..
1918	4	12	5	4	1	8	..	..	..	..	..	..	1	4	3	1	1	..
1919	5	8	16	4	1	9	..	..	..	..	..	..	..	..	..	4	1	18
1920	8	4	11	..	..	..	..	..	..	3	0	21	0	1	9	2	4	1
1921	5	7	4	1	3	16	..	..	..	4	2	0	1	1	3	0	7	11
1922	4	7	7	..	..	..	1	1	..	3	2	6	1	..	1	1	..	1
TOTAL	60	69	88	18	9	30	1	1	..	12	13	34	10	6	23	10	35	82
AVER AGE	6	7	9	2	1	4	1	1	..	1	1	3	2	1	2	4	3	8

APPENDIX J—contd.

Detailed statement showing the number of accidents and persons killed and injured during the ten years ending 1922.

Year.	PETROLEUM.			CHEMICALS.			MISCELLANEOUS.		
	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.	Number of accidents.	Persons killed.	Persons injured.
1913	12	19	10	...	...	...	2	...	3
1914	9	11	0	...	...	...	1	1	...
1915	15	17	32	...	...	...	...	...	...
1916	11	21	0	2	1	3	1	2	...
1917	8	4	7	...	...	...	6	5	29
1918	13	26	17	2	1	5	4	1	1
1919	12	15	50	1	5	...	3	2	2
1920	22	7	14	1	1	8	...	...	...
1921	7	8	20	...	...	...	3	4	2
1922	10	8	2	...	...	...	2	2	4
TOTAL	119	136	179	6	8	16	22	17	32
AVERAGE	12	14	18	1	1	2	2	2	3

APPENDIX K.

Comparative statement showing the number of accidents and persons killed and injured during the ten years ending 1922.

Year.	ACCIDENTS CAUSING LOSS OF LIFE OR BODILY INJURY.			Accidents not causing loss of life or bodily injury.	Total number of accidents.
	Number of accidents.	NUMBER OF PERSONS			
		Killed.	Injured.		
1913	46	47	76	1	47
1914	27	23	42	...	27
1915	25	23	40	2	27
1916	10	20	17	2	21
1917	27	10	40	...	27
1918	20	46	39	3	32
1919	23	32	95	6	29
1920	32	26	61	10	42
1921	27	32	61	2	29
1922	21	20	20	1	22
TOTAL	270	294	493	27	303
AVERAGE	28	29	49	3	30

APPENDIX L.

Letter No. 1200, dated 23rd June 1922, from the Chief Inspector of Explosives, India, to the Secretary to the Government of Bombay, General Department.

I have the honour to state that it appears that Padaw No. 5393 sank in Harbour at Bombay near Tucker Beacon on the 21st May 1922 when loaded with the following explosives :—

Gelignite 1"	1,120 cases
" 1½"	400 "
" 2"	250 "
Gelatine dynamite	150 "
Blasting gelatine	80 "
Ordinary Detonators	60 "
Electric Detonators	7 "
Electric Powder Fuses	5 "
	<hr/> 2,072 cases <hr/>

2. The following account of the accident is taken from the Instrument of Protest made by the Tindal of the Padaw.

By this Public Instrument of Protest be it known and made manifest unto all people, that on Monday, the 22nd day of May 1922, personally came and appeared before me Jivaji Dinshaw Ghandy, Notary Public by Royal Authority duly authorised, admitted and sworn and practising in Bombay in the Empire of India, Narayen Govind Tindal of the Padaw of burden 52-45 tons or thereabouts, registered No. 5393 of the Port of Bombay owned by Messrs. N. R. Nazir and Sons, who did duly and solemnly declare and state as follows : that is to say :—The Steam Launch "Anchorline" belonging to Messrs. N. R. Nazir and Sons about 6-30 A.M. on Saturday, 20th May 1922, towed the said Padaw then tight staunch and strong well manned and sound and in every respect fit with the Police peon No. 1443 alongside the S.S. "Clan Sinclair" then lying in the stream at the Explosives anchorage opposite the Apollo Bunder in the Bombay Harbour at about 8-45 A.M. and left the said Padaw there. That he the appearer, commenced at 11 A.M. to load in the Padaw cases of Explosives belonging to the Anglo-Siam Corporation, Ltd. After receiving 1,417 cases work was stopped at 5-30 P.M. when the said steam launch again came and towed the said Padaw and left it in the stream near the Princess Dock anchorage where it remained for the night. That the next morning (21st May 1922) at about 6 A.M. the said steam launch again towed the said Padaw and took it alongside the said S.S. "Clan Sinclair" at about 6-45 A.M. Work of taking in further cases commenced at about 8-15 A.M. After receiving 72 more cases work was stopped for a while at about 9 A.M. Work was again commenced at 10-30 A.M., and after 583 more cases were taken in, the taking in of the whole cargo of 2,072 cases was completed at about 12 noon. The Steam Launch "Margreat" belonging to the said Messrs. N. R. Nazir and Sons came and towed the said Padaw and commenced to take it to Matoonga Creeks for unloading. After proceeding about 200 yards from the said anchorage at about 1 P.M. noon that day a strong wind and heavy sea suddenly came on. The said Padaw commenced to ship water. The rope by which the said Padaw was being towed by the said steam launch was broken and the Padaw was separated therefrom. The said steam launch came back near the said Padaw and tried to fasten another rope to the Padaw but failed in the attempt owing to rough sea. That he (the appearer) and his crew of five commenced to bale out the sea water from the Padaw using buckets but failed to empty the same as the said Padaw was taking water at considerable speed. The said Padaw was soon filled with water and sank while between the two coal ships S.S. "Shaikh" and S.S. "Humayun" with all the cargo in it before any further assistance could be received. The tonny boat on the said Padaw was lowered in the water and the said Police peon and the crew of five rowed in it to the said Steam Launch "Margreat" while he the appearer remained clinging to the mast of the said Padaw which remained over the water surface. The said Tonny returned and took the Tindal to the Khajoor Bunder at about 6 P.M. He then reported the occurrence to the Harbour Police at about 7 P.M. that day. And this appearer does protest and I the said Notary do also protest against the aforesaid accident and occurrence and all loss and damage occasioned thereby. I the said Narayen Govind do solemnly and sincerely declare that the foregoing statement is correct and contains a true account of the facts and circumstances and I make this solemn declaration conscientiously believing the same to be true.

3. Upon receiving news of this accident I proceeded to Bombay and interviewed the Port Trust and the Anglo-Siam Corporation, Limited, Agents for Nobels'. I found that the Port Trust had spent four days in sweeping for the wreck but nothing could be found. It was also reported that part of the wreck had been seen floating out to sea, and that the mast had been picked up. It is certain therefore that the wreck had broken up.

4. It was also reported that about 50 cases of explosives had been washed ashore at Pir-Pau, Trombay Island and Thana Creek. Some of the cases of cartridges and of detonators

APPENDIX L—*contd.*

had been broken open by persons unknown and their contents scattered about the shore. The full and broken cases were collected as far as possible, and destroyed by the Anglo-Siam Corporation Limited.

5. Five sample cartridges of gelignite recovered from one of these cases were handed over to me for examination. The Chemical Examiner, Bengal, now reports that they are unsuitable for storage and sale to the public as they have lost their wrappers and have become generally unsuitable.

6. Upon enquiry I find that there are fifteen feet of soft mud round about the spot where the Padaw sank but as no obstruction could be felt when sweeping, it is probable that the remaining cases of explosives have become scattered and have sunk into the mud.

7. Gelignite will never become ineffective when lying under water. The main danger lies in the presence of cases of detonators. These consist of three varieties: (a) Ordinary detonators, (b) Electric detonators, (c) Electric Powder Fuses. Varieties (a) and (c) will become ineffective in a very short time but the Electric Detonators, of which there are seven cases only, will not become ineffective for months.

8. There are therefore about 2,000 cases of explosives lying scattered somewhere about Tucker Beacon mixed with a few cases of effective detonators. So long as these are left undisturbed there should be little danger but should a heavy ship's anchor or a dredger bucket come into sharp contact with a case of detonators there may be an explosion. As time goes on the wooden cases will break up and their contents will become more and more scattered and the danger of a big explosion become less and less. It is also probable that should one of these cases of detonators be exploded, that the explosion would not be communicated to the cases of high explosives lying round about on account of the mud and water in between, and as the cases become scattered the danger becomes smaller.

9. I recommend that the Port Trust buoy the spot where the Padaw sank. That, if possible, they make another attempt to locate the cases and remaining half of the Padaw. That they allow no ship to anchor or any dredger to dredge within 200 yards of this spot for the next five years. Moorings which are already down can be safely used.

10. I also recommend that in future all lighters, barges, etc., carrying explosives in all the ports and Harbours of India, be required to carry a buoy on deck with about 15 fathoms of 3" rope one end being attached to the buoy and one end to the lighter or barge, etc. I request that the Port Trust be asked to draw up a specification for the buoy and line and how these are to be attached. In fixing the length of rope it will be advisable to make it suitable for the deepest Harbour in India or Burma so that the one specification can be adopted by all Governments.

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